Registration No : | | | | | | | | | | |

Total Number of Pages : 02

Course: MBA
Sub_Code: 18MBA403D

4TH Semester Regular / Back Examination: 2022-23
SUBJECT: Operations Research Application
BRANCH(S): MBA,RM,BA,GM
Time : 3 Hour
Max Marks : 100
Q.Code : M338

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) Define a pure integer programming problem.

b) Which method is commonly used to solve Quadratic programming Problem?

c) Where is Branch and Bound method used?

d) What are the advantages of dynamic programming?

e) What are the methods used in solving integer programming problem?

f) Differentiate between top down and the bottom up approach. Give a real life example of Vehicle routing problem.

g) Write mathematical model of transportation problem.

h) What are the different types of vehicle routing problem?

i) Where vehicle routing problem is used?

j) Explain the term Balking and Reneging in queuing.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) What do you mean by scheduling system? Explain different types of scheduling system.

b) Explain Non primitive priority scheduling with giving advantages and disadvantages.

c) What do you mean by Vehicle routing problem? Explain its types.

d) What are the different ways to solve Vehicle routing problem?

e) What do you mean by portfolio optimization? Explain the process of optimal portfolio.

f) A branch of Punjab National bank has only one typist. Since the typing work varies in length, the type rate is randomly distributed approximately a poisson distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8 hours work day. If the type writer is valued at Rs.1.50 per hour. Determine Equipment utilization, the percent time that an arriving letter has to wait, Average system time and average cost due to waiting on the part of typewriter i.e it remaining idle.

g) Find out total transportation cost using Northwest corner rule:

Storehouse→ Company↓	A	B	C	Supply
P	12	15	19	200
Q	10	14	18	300
R	11	19	22	400
Demand	100	550	250	900

h) What are the variants involved in vehicle routing problem? Explain.

i) Explain the steps of Wolfe's method for solving quadratic programming problem.

j) State and explain Kuhn-Tucker condition.

k) What do you mean by initial basic feasible solution? How to find out initial basic feasible solution using Northwest corner rule giving suitable example.

l) Briefly explain elements of Queuing system?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What are the different types of models used in operation research? Explain. **(16)**

Q4 What are the tools and techniques used in operations research? Explain. **(16)**

Q5 The profit for the three markets as a function of sales effort expended, is given in the table below. How will you distribute a given number os salesmen, so as to achieve maximum profit (Using Dynamic Programming) **(16)**

No of sales Man	0	1	2	3	4	5	6	7
Market1.	40	42	50	60	66	75	82	90
Market2	50	60	65	75	85	95	110	120
Market3	50	60	70	80	88	105	115	130

Q6 Find an optimum integer solution to the following LPP **(16)**

Max Z = X = 2Y

Subject to constraint: $X + Y \leq 7$

$2Y \leq 7$

$X, Y \geq 0$ and X, Y are integer